

California Energy Commission  
Alternative and Renewable Fuel and Vehicle  
Technology Program

## FINAL PROJECT REPORT

# City of Corona Electric Vehicle Charging Infrastructure

Prepared for: California Energy Commission

Prepared by: City of Corona, Department of Water and Power



*City of Corona, California*

California Energy Commission

Gavin Newsom, Governor



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## PREFACE

Assembly Bill (AB) 118 (Núñez, Chapter 750, Statutes of 2007), created the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP). The statute authorizes the California Energy Commission to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. AB 8 (Perea, Chapter 401, Statutes of 2013) re-authorizes the ARFVTP through January 1, 2024, and specifies that the Energy Commission allocate up to \$20 million per year (or up to 20 percent of each fiscal year's funds) in funding for hydrogen station development until at least 100 stations are operational.

The ARFVTP has an annual budget of approximately \$100 million and provides financial support for projects that:

- Reduce California's use and dependence on petroleum transportation fuels and increase the use of alternative and renewable fuels and advanced vehicle technologies.
- Produce sustainable alternative and renewable low-carbon fuels in California.
- Expand alternative fueling infrastructure and fueling stations.
- Improve the efficiency, performance and market viability of alternative light-, medium-, and heavy-duty vehicle technologies.
- Retrofit medium- and heavy-duty on-road and non-road vehicle fleets to alternative technologies or fuel use.
- Expand the alternative fueling infrastructure available to existing fleets, public transit, and transportation corridors.
- Establish workforce training programs and conduct public outreach on the benefits of alternative transportation fuels and vehicle technologies.

To be eligible for funding under the ARFVTP, a project must be consistent with the Energy Commission's ARFVTP Investment Plan, updated annually. The Energy Commission issued PON-13-606 to fund electric vehicle charging infrastructure. In response to PON-13-606, the recipient submitted an application which was proposed for funding in the Energy Commission's Notice of Proposed Awards April 4, 2014 and the agreement was executed as ARV-14-001 on September 11, 2014, amended on March 29, 2016 (to change locations for some of the chargers and extend the agreement period by three months), amended again on February 16, 2017 (to allow an 11-month, no-cost time extension to complete the charging stations installation), and amended a third time on December 18, 2017 (to allow a seven-month, no-cost time extension to collect six months of data).

## ABSTRACT

This is the final report for Agreement ARV-14-001 between the California Energy Commission and the City of Corona to install nine electric vehicle charging stations at four locations with funding from PON 13-606. The city applied for funding to expand its Plug-in Electric Vehicle (PEV) charging infrastructure for the following reasons: 1) to efficiently and cost-effectively provide enough charging stations for electric vehicles in Corona, 2) to further the city's goals of being environmentally responsible while increasing energy independence, and 3) to encourage "green" thinking and policies among businesses and residents. This report discusses the project background and objectives, scope of work, problems encountered, usage trends, and project benefits, fulfilling the requirements of Agreement ARV-14-001.

**Keywords:** California Energy Commission, City of Corona, Department of Water and Power, Electric Vehicle Infrastructure

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## EXECUTIVE SUMMARY

The City of Corona is dedicated to supporting clean air policies and infrastructure that will encourage residents to use modes of transportation that can reduce greenhouse gas emissions in Southern California. In 2004, the United States Environmental Protection Agency rated the Riverside-San Bernardino area (where Corona is located) as having the worst particulate air pollution in the United States (see *Plagued by Pollution: Unsafe Levels of Soot Pollution in 2004*. Environment California Research & Policy Center, 2016). Research has linked regulated air pollutants such as ozone and particulate matter to lung and heart disease and other health problems (see [epa.gov/air-research](http://epa.gov/air-research)). Increasing electric vehicle use is an important part of Corona's strategy to meet energy independence and positively affect the environment and health of its residents.

The city applied for funding from the Energy Commission to augment its electric vehicle infrastructure. At the time the city submitted its application, the city was not able to meet the demands of the registered plug-in electric vehicle (PEV) drivers in the area. Additional stations were needed to accommodate existing PEV drivers as well as encourage an increased number of residents to purchase PEVs. The city's objective was to offer convenient charging at strategically placed stations throughout the city, eliminating competition at the existing charging stations and diminishing the "range anxiety" PEV drivers have when they have limited access to stations. The City of Corona received awards from the Energy Commission and the South Coast Air Quality Management District, helping the city to continue its investment in alternative transportation infrastructure projects.

Installation of eight new charging stations through this project builds upon the city's dedication to air quality improvement and development of alternative fuel sources infrastructure. The city's Alternative Fuel Rebate Program provided \$2,000 for Corona residents who bought new qualified alternative fuel vehicles (or \$1,000 to residents who bought qualified used vehicles). The city rewarded residents for purchasing electric vehicles and has now provided easily accessible charging stations for those vehicles. All new stations are publicly accessible and available 24 hours a day, and the chargers at Corona Pointe and The Shops at Dos Lagos each have one American Disability Act (ADA) accessible parking stall. Eight electric vehicle charging stations were installed as follows:

**Table ES.1: Electric Vehicle Charging Station Locations**

General Location	Address	No. of Chargers	Type of Chargers	Station Activation Date
Dos Lagos	2750 Cabot Drive	3	Level 2	10/20/2017
Corona Pointe	1008 Montecito Drive	3	Level 2	10/20/2017
City Hall	386 S. Vicentia Avenue	1	Level 3	01/05/2018
Corporation Yard	717 Public Safety Way	1	Level 3	01/05/2018

Source: City of Corona, Department of Water and Power

Although the city encountered some unexpected delays with project execution, all stations were installed and fully operational by January, 2018. Two sites were completed by October, 2017, allowing for early data collection from six chargers. A table summarizing the average monthly utilization of the charging stations is listed below (not including October 2017 which was a partial month):

**Table ES.2: Average Monthly Utilization (charging hours/24x30 hours)**

Source: City of Corona, Department of Water and Power

Month	Total Sessions Level 2	Average Utilization Level 2	Total Sessions Level 3	Average Utilization Level 3	Most Utilized Location
November 2017	65	2%	-	-	Corona Pointe
December 2017	115	5%	-	-	Corona Pointe
January 2018	120	6%	47	3%	Corona Pointe
February 2018	121	3%	79	5%	Corona Pointe
March 2018	130	4%	58	3%	Corona Pointe
April 2018	143	5%	25	1%	Corona Pointe

# CHAPTER 1:

## Project Background and Objectives

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The City of Corona is in Riverside County, which consistently receives failing grades for excessively high ozone, the average daily presence of particle pollution, and long-term particle pollution levels by the American Lung Association<sup>1</sup>. The goal of the region’s air quality “watchdog,” the South Coast Air Quality Management District (SCAQMD), is to clean the air and protect the health of all residents in the South Coast Air District through practical and innovative strategies.

Corona is committed to supporting activities that align with the SCAQMD’s goals as well as the goals laid out in the Southern California Plug-in Electric Vehicle Readiness Plan (December, 2012)<sup>2</sup>, developed by the Southern California Association of Governments. The City applied for funding for this project to expand the City of Corona’s plug-in electric vehicle infrastructure, to support the growing number of PEV drivers and help the region meet air quality goals and greenhouse gas (GHG) reductions goals, which in turn benefits the health of City residents.

The City of Corona Department of Water and Power (DWP) chose strategic locations for the charging stations based on existing PEV infrastructure, proximity to destinations and workplaces, and whether Corona DWP provided electricity to each site through its municipally-owned electric utility. Post award of funding, the city opted to abandon one of the sites and chose two alternate, more suitable sites for installing the stations. The reasons, discussed in the lessons learned section, dealt with issues that arose with the property owners.

To complement this project, the city applied for and was awarded another grant from the Energy Commission, to increase awareness of the availability, location, cost, and charging capabilities of the new charging stations, and to develop residential electric vehicle charging station (EVCS) installation processes and rate structures and analyze infrastructure readiness to support the growing demand (“PEV Readiness” project, agreement ARV-14-041). Together, these two Energy Commission-funded projects are helping Corona further its goals to improve air quality by increasing its alternative fuel infrastructure.

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<sup>1</sup> <http://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/states/california/riverside.html>

<sup>2</sup> <https://www.scag.ca.gov/Documents/SCAG-Southern%20CA%20PEV%20Readiness%20Plan.pdf>

# Chapter 2: Scope of Work

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## 2.1 Summary of Tasks Completed

**Table 1: Summary of Tasks Completed**

TASK	STATUS
<b>Task 1 ADMINISTRATION</b>	
Task 1.1 Attend Kick-off Meeting	Held on December 2, 2014.
Task 1.2 Critical Project Review (CPR) Meetings	None held/requested.
Task 1.3 Final Meeting	Not held yet.
Task 1.4 Monthly Progress Reports	Emailed to the Energy Commission monthly from January 2016 through April 2018.
Task 1.5 Final Report	Provided to the Energy Commission in June 2018 (this document).
Task 1.6 Identify and Obtain Matching Funds	Letter documenting match funds commitment submitted to the Energy Commission on May 25, 2016.
Task 1.7 Identify and Obtain Required Permits	All required permits, including building permits and licensing agreements, were obtained and submitted to the Energy Commission. Environmental Notices of Exemption for all project locations were filed with the county and forwarded to the Energy Commission.
Task 1.8 Obtain and Execute Subcontracts	Contracts with all subcontractors were forwarded to the Energy Commission.  Major Subcontractors: <ul style="list-style-type: none"> <li>• Clean Fuel Connection</li> <li>• Baker Electric</li> </ul> Minor Subcontractors: <ul style="list-style-type: none"> <li>• Blais &amp; Associates</li> <li>• Padilla &amp; Associates</li> <li>• Armstrong &amp; Brooks</li> <li>• L.R. Landscaping</li> <li>• Pacific Utility</li> </ul>

<b>Task 2 INSTALL ELECTRIC VEHICLE CHARGING STATIONS</b>	
Task 2.1 Equipment Procurement	Copies of equipment order forms, design plans, and installation schedules (including revisions) were submitted to the Energy Commission.
Task 2.2 Installation of Charging Stations	All stations were installed, operational, and available to the public as of January 2018. Photographs of the stations were submitted to the Energy Commission.
Task 2.3 Test Plan	A Test Results Report was submitted to the Energy Commission with the January 2018 Progress Report. Documentation of city staff training was submitted with the October 2017 Progress Report.
<b>Task 3 DATA COLLECTION &amp; ANALYSIS</b>	See Chapter 3.

Source: City of Corona, Department of Water and Power

## 2.2 Equipment Installed

The city selected and contracted with experienced vendors to procure and install eight (8) new electric vehicle charging stations at the following four (4) central locations throughout the city:

- 1) Corona Pointe: Three (3) ChargePoint CT4000 Level 2 chargers
- 2) The Shops at Dos Lagos: Three (3) ChargePoint CT4000 Level 2 chargers
- 3) City Hall: One (1) ChargePoint CPE200 Express/50 kW dual-port Level 3 charger with both CHAdeMO and SAE Combo connectors
- 4) Corporation Yard: One (1) ChargePoint CPE200 Express/50 kW dual-port Level 3 charger with both CHAdeMO and SAE Combo connectors

All chargers are part of the ChargePoint network. By downloading the mobile app from ChargePoint's website, customers can 1) see which stations are available for charging, 2) start charging by holding the phone up to the card reader at the station, 3) receive notifications when the car is finished charging or when a station becomes available, 4) schedule charging, set reminders, get notifications and track usage, and 5) alert ChargePoint when issues are encountered. City staff and its contractors, with the help of Southern California Edison (SCE), performed all tasks required to complete installation of the stations, including:

- Obtaining all required permits for the work and follow-up maintenance;
- Ensuring site design was specific to charger hardware and met necessary codes;

- Evaluating enough capacity from the existing electrical system and meter location;
- Obtaining necessary easements from private property owners;
- Granting easements to SCE for electric equipment installation;
- Working with vendors and on-site property managers/owners to minimize disruptions to normal customer and employee traffic;
- Ensuring proper safety and American Disability Act (ADA) compliance measures were in place;
- Completing site work, and installing conduits, meters and other necessary hardware;
- Installing chargers;
- Training staff on charging station operation;
- Repairing landscaping following station installation;
- Testing all equipment and ensuring that it meets all permitting requirements and code compliance;
- Taking photographs of completed stations (see Appendix A); and
- Completing public outreach activities to advertise and promote the new stations.

## 2.3 Public Outreach

The city completed the following public outreach activities (see Appendix B):

- Posted *Inner Circle News* e-newsletter article titled “Coming Soon: Electric Vehicle Charging Stations & Bike Racks, Lockers!” in June 2016.
- Posted *Inner Circle News* e-newsletter article titled “New Electric Vehicle Charging Stations Installed with Grant Funds” in January 2018:  
<https://www.coronaca.gov/Home/Components/News/News/2461/17>.
- Worked with The Shops at Dos Lagos to advertise the installation of the new charging stations through Facebook.
- Added information about the new stations to the city’s mobile application, including maps to locations.
- Added a link on the city’s website (Services/EV Charging Stations) to the station locations on Google Maps:  
<https://www.google.com/maps/search/electric+vehicle+charging+station/@33.8491426,-117.5824535,13.32z?hl=en>.
- The city has and continues to bring its own electric vehicle, a Nissan Leaf, to many public outreach events, including its annual Garden Festival, to educate the public and encourage electric vehicle use.
- The city has plans to perform further outreach utilizing funds from a second grant from the Energy Commission through ARV-14-041.

## 2.4 Problems Encountered

Unanticipated delays were encountered with the installation of the charging stations, including staffing shortages in the city's Purchasing Department. The task of issuing the Request for Proposals for charging station installation at two of the four locations was delayed until November, 2016, and a contract was not awarded until January, 2017. After preliminary site work had been completed, the city's Building Department informed the project team that the ADA requires one ADA space for every six EV charging spaces. To accommodate this requirement, the city needed to complete a striping design layout and issue a change order with the contractor to switch the locations of the current and future chargers (extra runs were installed at both Dos Lagos and Corona Pointe, so that in the future the city could expand and install additional EV stations).

The city also experienced delays with the work at the other two locations (City Hall and Corporation Yard). The city needed to complete the easement process with SCE for the City Hall and Corporation Yard sites, a process that involved City Council approval and filing the easements with the County of Riverside. The task of providing design plans for setting the meter pedestals by SCE took longer than expected, partly due to staffing changes within SCE. SCE also had to complete final meter installation for the chargers at these locations, which could not be scheduled until a month following the release by the City of Corona Building Department.

Due to the delays, the city requested and received two no-cost time extensions from the Energy Commission to allow the city to complete four station site installations and collect at least six months of data from the project.

# Chapter 3: Data Collection and Analysis

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## 3.1 Methods and Results

The city collected at least six months of throughput, usage, and operations data from the Level 2 chargers at Dos Lagos Shopping Center and Corona Pointe (six chargers total), beginning when these stations became fully operational in October, 2017 through April, 2018. The charging stations capture data on an ongoing basis, which can be accessed and customized depending on the desired parameters.

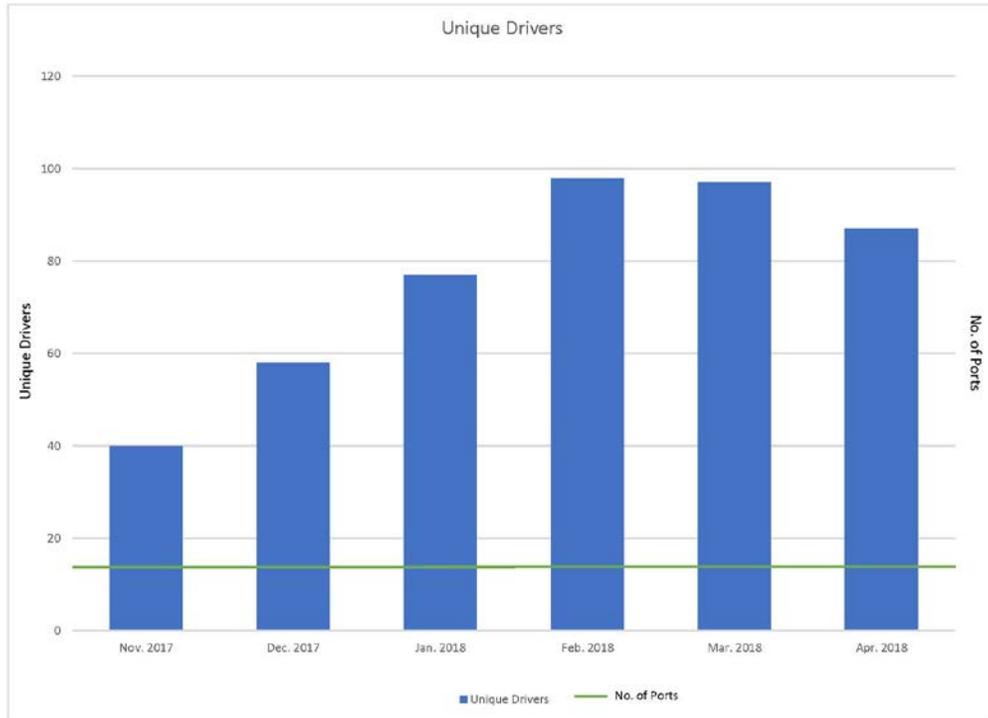
Between November, 2017 and April, 2018, an average of 76 unique drivers accessed the electric vehicle charging stations, with a high of 98 unique drivers in February, 2018. The table below breaks down the unique users by charger type. The month of October, 2017 was not included in the table, because the chargers were not operational for the full month.

**Table 2: Unique Drivers by Month**

<b>Month</b>	<b>Fast Chargers</b>	<b>Level 2 Chargers</b>	<b>Total Unique Drivers</b>
November 2017	-	40	40
December 2017	-	58	58
January 2018	22	55	77
February 2018	28	70	98
March 2018	26	70	96
April 2018	17	70	87
<b>Average:</b>	<b>23</b>	<b>60</b>	<b>76</b>

Source: City of Corona, Department of Water and Power

**Figure 1: Unique Drivers by Month**



Source: City of Corona, Department of Water and Power

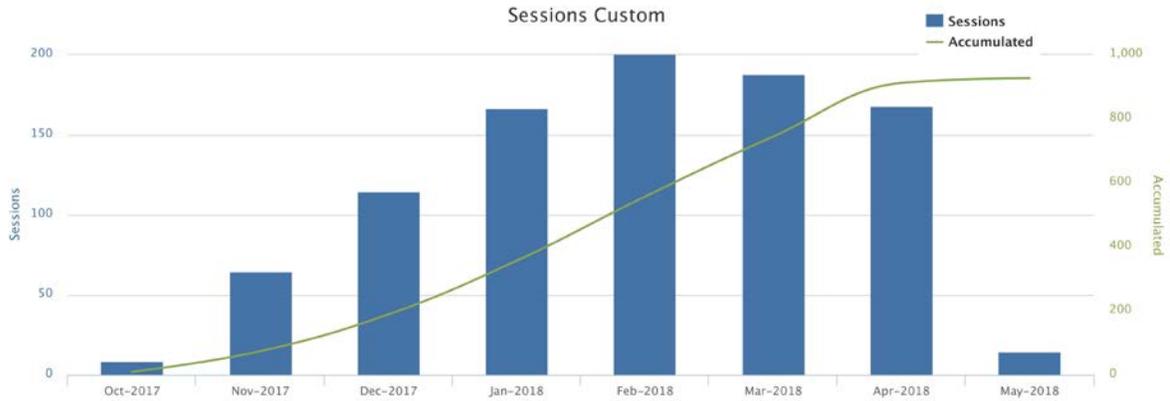
There has been a total of 912 sessions for all 14 ports from October, 2017 through April 30, 2018. This equates to an average of 130 charging sessions each month.

**Table 3: Sessions**

Month	No. of Sessions	Accumulated
November 2017	65	74
December 2017	115	189
January 2018	167	356
February 2018	200	556
March 2018	188	744
April 2018	168	912
<b>Average:</b>	<b>130</b>	-

Source: City of Corona, Department of Water and Power

**Figure 2: Sessions**



Source: City of Corona, Department of Water and Power

A vast majority of the sessions are for a time period of three hours or less. Of the 912 sessions that occurred between October, 2017 and April, 2018, 748 sessions, or 82 percent, were for three hours or less. The remaining 164 sessions, or 18 percent, were over three hours in length, with the longest two sessions totaling 14 hours. Since October, 2017, a total of 6,318.43 kilowatt hours (kWh) has been used at all the stations combined. This averages 902.63 kWh per month.

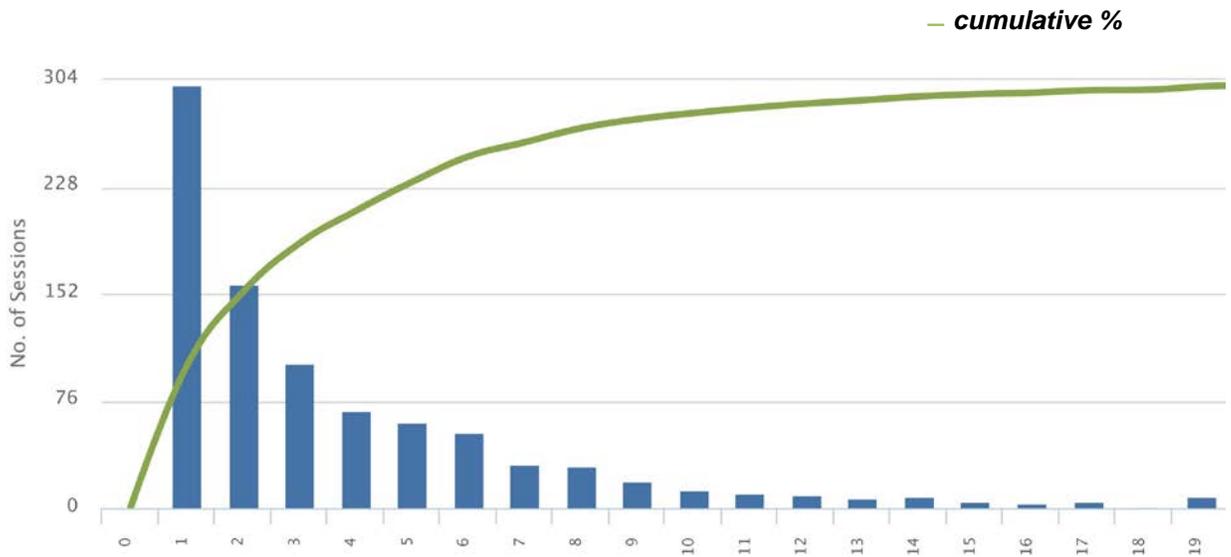
**Table 4: Session Length**

Session Length (hours: minutes)	Sessions	Cumulative %
0:00	0	0
0:30	301	33
1:00	159	50.44
1:30	103	61.73
2:00	70	69.41
2:30	61	76.1
3:00	54	82.02
3:30	31	85.42
4:00	30	88.71
4:30	19	90.79
5:00	13	92.21
5:30	11	93.42
6:00	9	94.41
6:30	7	95.18
7:00	8	96.05
7:30	5	96.6
8:00	3	96.93
8:30	5	97.48

9:00	1	97.59
9:30	8	98.46
10:00	4	98.9
10:30	4	99.34
11:00	2	99.56
11:30	2	99.78
12:00	0	99.78
12:30	0	99.78
13:00	0	99.78
13:30	0	99.78
14:00	2	100
<b>Total:</b>	<b>912</b>	

Source: City of Corona, Department of Water and Power

**Figure 3: Session Length Histogram (each 30-minute increments)**



Source: City of Corona, Department of Water and Power

**Table 5: Energy Use**

<b>Month</b>	<b>Energy (kWh)</b>	<b>Accumulated (MWh)</b>
November 2017	306.473	0.342
December 2017	609.082	0.952
January 2018	1,216.396	2.168
February 2018	1,733.153	3.901
March 2018	1,339.998	5.241
April 2018	1,077.355	6.318
	<b>Average: 1047.07 kWh/month</b>	<b>Cumulative: 18.958 MWh</b>

Source: City of Corona, Department of Water and Power

The table below illustrates the average monthly utilization of the charging stations. The most utilized location has been the Corona Pointe station (Level 2 chargers). This primarily may be due to the type of location; Corona Pointe is a work-place, as opposed to the other locations which are a retail center (Dos Lagos) and municipal facilities (City Hall and Corporation Yard). Corona Pointe may be used more consistently by the same drivers on a regular basis - those who commute there. The other locations are being used by drivers that are stopping at the sites on their way to another destination; those drivers may not frequent the area on a regular basis.

The pricing structure was conducted under a PEV Readiness Grant from the Energy Commission. The fast chargers are priced at a flat rate of \$0.49/kWh, and the Level 2 chargers are \$0.29/kWh. The city currently does not collect any additional revenues from ads. Even though the stations are available 24 hours a day, seven days a week, they are not being highly utilized. It is unclear why this is the case at this time; it may be a combination of factors such as price, demand, or public awareness of the stations.

**Table 6: Average Monthly Utilization (hours)**

<b>Month</b>	<b>Corona Pointe (workplace L2)</b>	<b>Dos Lagos (public L2)</b>	<b>City Hall (public DC)</b>	<b>Corporation Yard (public DC)</b>
Nov-17	10	8	-	-
Dec-17	28	9	-	-
Jan-18	39	18	14	14
Feb-18	21	15	33	8
Mar-18	22	19	21	8
Apr-18	35	18	4	4

Source: City of Corona, Department of Water and Power

Based upon the energy consumed from Corona’s electric vehicle charging stations through April 30, 2018 (6,318.43 kWh), the City of Corona calculates that 187.49 gallons of gasoline have been displaced (6,318.43 kWh divided by 33.7 kWh/gallon of gasoline = 187.49 gallons). This is based upon the gasoline gallon equivalent of 1 kWh/mile being equal to 33.705 miles per gasoline gallon equivalent<sup>3</sup>. Since October 2017, 2,653.74 kg of greenhouse gas emissions (GHG) have been avoided.

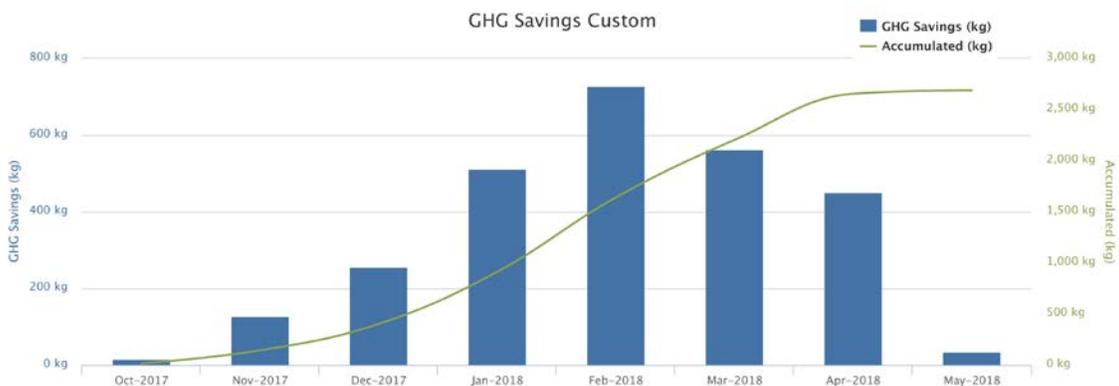
The City of Corona does not currently have plans for renewable energy use at these facilities. The city does, however, have a Renewable Portfolio Plan. And, according to the city’s 2016 Power Content Label, the city purchases 6 percent of its power from large hydroelectric facilities.

**Table 7: GHG Savings**

Month	GHG Savings (kg)	Accumulated (kg)
November 2017	128.719	143.828
December 2017	255.814	399.642
January 2018	510.886	910.528
February 2018	727.924	1,638.452
March 2018	562.799	2,201.251
April 2018	452.489	2,653.74
<b>Average:</b>	<b>379.106</b>	

Source: City of Corona, Department of Water and Power

**Figure 4: GHG Savings**



Source: City of Corona, Department of Water and Power

<sup>3</sup> <https://www.aqua-calc.com/convert/electric-car-energy-economy/kilowatt-hour-per-mile-to-miles-per-gallon-gasoline-equivalent>

While there was temporary job creation due to the installation of the charging stations, the city does not currently anticipate job creation, economic development, or increased state revenue as a result of the installation of these charging stations. The actions of installing the stations are not considered significant job creation or economic development.

The grant application for the project estimated that 267.59 metric tons of CO<sub>2</sub> will be eliminated from California's environment per year. This is equivalent to 267,590 kg of CO<sub>2</sub>. However, in the initial 7 months of the project, only 2,653.74 kg of CO<sub>2</sub> have been saved. If we average the last three months of usage and add that in to project savings for a full year, only around 6,000 kg of CO<sub>2</sub> will have been saved in the first year, which is roughly 2.26 percent of what was estimated. The assumptions in the grant application optimistically estimated that the stations would be utilized 80 percent of a regular work day, or approximately 7.2 hours per day. Originally, nine Level 2 chargers were to be installed at three charging station sites, but the project scope of work was amended and three Level 2 chargers at one site were replaced by two Level 3 chargers at two sites. However, based on information to date, the stations are only being utilized a fraction of the available time. This may be due to several reasons, including awareness of the station locations as well as the rates for the electric vehicle stations. The city has received a grant from the Energy Commission to perform a rate study, which will help the city to set EV charging rates that are competitive yet still help to recover costs associated with electricity usage and station maintenance. The grant also includes funds to help make the public aware of the availability of the charging stations, which will help to increase the station utilization.

### **3.2 Trends and Observations**

Based on the data collected to date, there was a dramatic increase in station usage between October, 2017 and January, 2018. This makes sense, as the stations were first installed and awareness of those frequenting the area increased. From November to December 2017, the number of charging sessions increased by 155 percent; there are corresponding increases in GHG savings and energy use as well during the same time period. Since then, there continues to be increases in sessions and usage, but not as dramatic.

Additionally, the number of unique drivers using the stations initially increased but has started to decline slightly in the last two months. The cause of this is unknown at this time, but as stated previously may be due to the costs that are being charged at the stations. The city is reviewing the rates as it undergoes its electric rate study. The city will continue to monitor this trend and hopes to see a bump in unique drivers and usage after regional promotion of the stations.

### 3.3 Projected Emissions and Economic Benefits

The city anticipated several economic benefits that would result from the installation of the electric vehicle charging stations. These benefits included increasing revenue for The Dos Lagos Shopping Center and promoting an environmentally responsible image for Corona Pointe, as well as providing some economic benefits to the retail establishments in Corona Pointe. The data has shown an increase in the number of different electric vehicle charging station users and volume of energy and hours consumed at the stations. This is positive as it indicates that the stations are attracting new and different EV users. However, it is difficult to quantify sales revenue increases currently, as the stations have only been in use for approximately seven months.

The city anticipates that revenue from the charging stations pay for the maintenance expenses that are involved in owning the charging stations. From installation through April, 2018, a total net revenue of \$1,522.87 has been received from ChargePoint. This amount is net of the service fees from ChargePoint, which total \$168.99, or 10 percent of the gross revenues to date. A summary of the revenues to date are shown in the table below:

**Table 8: Revenue**

<b>Date</b>	<b>Revenue</b>	<b>Accumulated Gross Revenue</b>	<b>ChargePoint Service Fees</b>	<b>Net Revenue</b>	<b>Accumulated Net Revenue</b>
October 2017	\$9.59	\$9.59	\$0.95	\$8.64	\$8.64
November 2017	\$87.65	\$97.24	\$8.75	\$78.90	\$87.54
December 2017	\$176.58	\$273.82	\$17.62	\$158.96	\$246.50
January 2018	\$200.44	\$474.26	\$19.99	\$180.45	\$426.95
February 2018	\$388.32	\$862.58	\$38.79	\$349.53	\$776.48
March 2018	\$477.47	\$1,340.05	\$47.75	\$429.72	\$1,206.20
April 2018	\$351.81	\$1,691.86	\$35.14	\$316.67	\$1,522.87
<b>Average:</b>	<b>\$241.69</b>			<b>\$217.55</b>	

Source: City of Corona, Department of Water and Power

**Figure 5: Revenue**



Source: City of Corona, Department of Water and Power

While the first year of service is included with the purchase of the stations, support for each station is \$4,200 per year per Level 3 charging station, according to a quote from ChargePoint. This would total approximately \$33,000 per year for maintenance costs if the city opts to utilize the ChargePoint service. If that is the case, the current revenues will not be enough to recoup those costs. Additional revenues will need to be collected through increased use of the stations. Additionally, the City of Corona is currently conducting a rate study with another grant from the Energy Commission. This study will help the city set the rates charged to electric vehicle charging station end users in order to properly recoup maintenance costs for the stations.

# Chapter 4: Conclusion

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## 4.1 Lessons Learned

The project has been a great learning experience for the City of Corona. The world of electric vehicles and their associated benefits and limitations pose both interesting challenges and opportunities. One of the first lessons that the city learned was there was a lack of a common charging standard from car manufacturers. This made the selection of a charging station a difficult decision. The city wanted some flexibility in adapters that are offered to its patrons, to avoid alienating electric vehicle drivers that may or may not have a compatible vehicle.

Another issue that was encountered during the project dealt with the placement, operation and ownership of the charging stations. Originally, there were going to be two workplace charging station sites; one at the current Corona Pointe site, and the other at an office complex near The Shops at Dos Lagos. However, there was difficulty with the private property owners wanting to have more control over the operation of the stations than the city felt was necessary, including control over who would have access to charging at the station. They also did not want to allow public access to the stations 24 hours a day, seven days a week. These issues eventually lead to the city not using The Shops at Dos Lagos location and installing two charging stations at city facilities, where there was more flexibility.

Without the addition of grant funding, the city may not have been able to install the charging stations. Currently, revenues from the stations are not enough to make a business case for ownership based on electricity revenues alone.

## 4.2 Future Efforts

To inform future decisions regarding alternative fuel infrastructure, the city will perform market research on the rates it charges to ensure competitiveness. The city is also in the process of undergoing an electric rate study with the added component of evaluating the city's readiness for future anticipated electric vehicle use and its impacts to its electric system. The City of Corona is also a municipally owned electric utility, providing electricity to several distinct sections of the city. One of these areas, known as Dos Lagos, contains residential development. The city wants to encourage and be prepared for the proliferation of electric vehicles. As part of this process, the city will better understand and be able to set appropriate rates that both encourage electric vehicle use and provide for appropriate cost recovery.

In completing this project, city staff had the forethought to install extra runs at both Dos Lagos and Corona Pointe to allow for expansion of the charging station

infrastructure at these two centrally-located sites. The city will monitor current station usage to determine if/when those additional stations are needed. Future reductions in greenhouse gas emissions, traffic congestion, and noise pollution are expected through economies of scale from expansion of infrastructure that facilitates the use of alternative fuel and active modes of transportation.

## Acronyms and Abbreviations

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Original Term	Acronym/Abbreviation
American Disability Act	ADA
Department of Water & Power (Corona)	DWP
Plug-in Electric Vehicle	PEV
Particulate Matter	PM
South Coast Air Quality Management District	SCAQMD

# APPENDIX A: Photographs

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Figure A.1: Charging Station – City Hall



Source: City of Corona, Department of Water and Power

Figure A.2: Charging Station – Corporation Yard



Source: City of Corona, Department of Water and Power

**Figure A.3: Charging Stations – Corona Pointe**



Source: City of Corona, Department of Water and Power

**Figure A.4: Charging Stations – Dos Lagos**



Source: City of Corona, Department of Water and Power

# APPENDIX B: Public Outreach Materials

Figure B.1: Media Outreach Efforts

The screenshot shows the City of Corona website with the following content:

**Inner Circle CORONA.com**

City of Corona's Community

NEWS TRAFFIC SEE CLICK FIX CALENDAR MAYOR'S MESSAGE VIDEOS PUBLIC MEETING AGENDAS ABOUT

### Coming Soon: Electric Vehicle Charging Stations & Bike Racks, Lockers!

Posted on June 23, 2016 by City of Corona

Do you want to ride your bike more, but don't have a place to secure it? Have an electric vehicle that needs a quick charge while you're on the road? We've got some good news for you! The City of Corona received grant funding to install bicycle racks and electric vehicle (EV) charging stations. Two grants were obtained, one from the California Energy Commission (CEC) and the other from the South Coast Air Quality Management District (SCAQMD) Mobile Source Air Pollution Reduction Review Committee (MSRC).

**Electric Vehicle Charging Stations**

A total of 9 electric vehicle charging stations will be installed at four locations throughout the City. There will be six Level 2 chargers and three Level 3 DC fast chargers. Charging stations will be conveniently located at:

- Corona Pointe [MAP]
  - 3 Level II Chargers at Corona Pointe, 1265 Corona Pointe Court
- The Shops at Dos Lagos [MAP]
  - 3 Level II Chargers at The Shops at Dos Lagos, 2780 Cabot Drive
- City Hall [MAP]
  - 1 DC Fast Charger at Corona City Hall, 400 S. Vicentia Avenue
- Corporation Yard [MAP]
  - 2 DC Fast Chargers at Corona's Corporation Yard, 735 Public Safety Way

**Bicycle Lockers and Racks**

With these funds, the City will install a total of 20 bicycle lockers and 43 bike racks. Each locker can hold one bike. Bike lockers and racks will be installed at the following locations:

Location	Bike Racks	Bike Lockers
Auburndale Park	1	
Border Park	1	
Brentwood Park	1	
Butterfield Park	1	
Chase Park	1	
Circle City Center	1	2
Citrus Park	2	4
City Corporation Yard		2
City Hall		4
City Park	3	
Contreras Park	1	

[

**Figure B.1 (cont.): Media Outreach Efforts**

Corona Police Department	1	2
Creste Verde Park	1	
Department of Water and Power		2
Fairview Park	1	
Husted Park	1	
Jameson Park	1	
Joy Park	1	
Kellogg Park	1	
Lincoln Park	2	
Mangular Park	1	
Merrill Park	1	
Mountain Gate Park	2	
Ontario Park	1	
Parkview Park	1	
Promenade Park	3	
Ridgeline Park	1	
River Road Park	1	
Rock Vista Park	1	
Santana Park	4	4
Serfas Club Park	1	
Sheridan Park	1	
Spyglass Park	1	
Stagecoach Park	1	
Victoria Park	2	

Look for more announcements when these new facilities will be ready for use. For questions, please contact the City of Corona Department of Water and Power or Maintenance Services Department at 951-736-2234.

- [Recommend on Facebook](#)
- [Share on LinkedIn](#)
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**Similar Stories**

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- [EARLY BIRD: Inaugural Women's Leadership Conference! \(\)](#)
- [Economy Rolling in Corona! \(\)](#)
- [Beware: Water Insurance NOT Supported by Corona DWP \(\)](#)

Source: City of Corona, Department of Water and Power

Figure B.2: Media Outreach Efforts





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## Stay Connected

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### New Electric Vehicle Charging Stations Installed with Grant Funds

The City of Corona is pleased to announce that a total of 8 electric vehicle charging stations have been installed at four locations throughout the City. The stations were funded through grants received by the California Energy Commission's (CEC) [Alternative and Renewable Fuel and Vehicle Technology Program](#) and the South Coast Air Quality Management District's (SCAQMD) [Mobile Source Air Pollution Reduction Committee \(MSRC\)](#). There are 6 Level II chargers and 2 Level III DC fast chargers.

**Charging stations are located at:**

- [Corona Pointe](#) (3 Level II chargers)
- [The Shops at Dos Lagos](#) (3 Level II chargers)
- [City Hall](#) (Level III charger)
- [Corporation Yard](#) (Level III charger)

All chargers are part of the ChargePoint network. You can create a Chargepoint account by [signing up through their website](#) or [downloading their mobile app](#).

The City of Corona would like to thank Rexco Magnolia, LLC and The Shops at Dos Lagos for working with the City to install the charging stations for the public's use and benefit.

For questions, please contact the [City of Corona Department of Water and Power](#) or [Maintenance Services Department](#) at (951) 736-2234.

[Return to full list >>](#)








 Mayor's Message
 Download Mobile App

#### Submit a Story

The City of Corona is always looking for suggestions on stories and we would love to hear from you on what you would want to see on the Inner Circle News. [Click here to send us your suggestions and we'll do our best to include them!](#)

#### Sign up for the Inner Circle Newsletter!

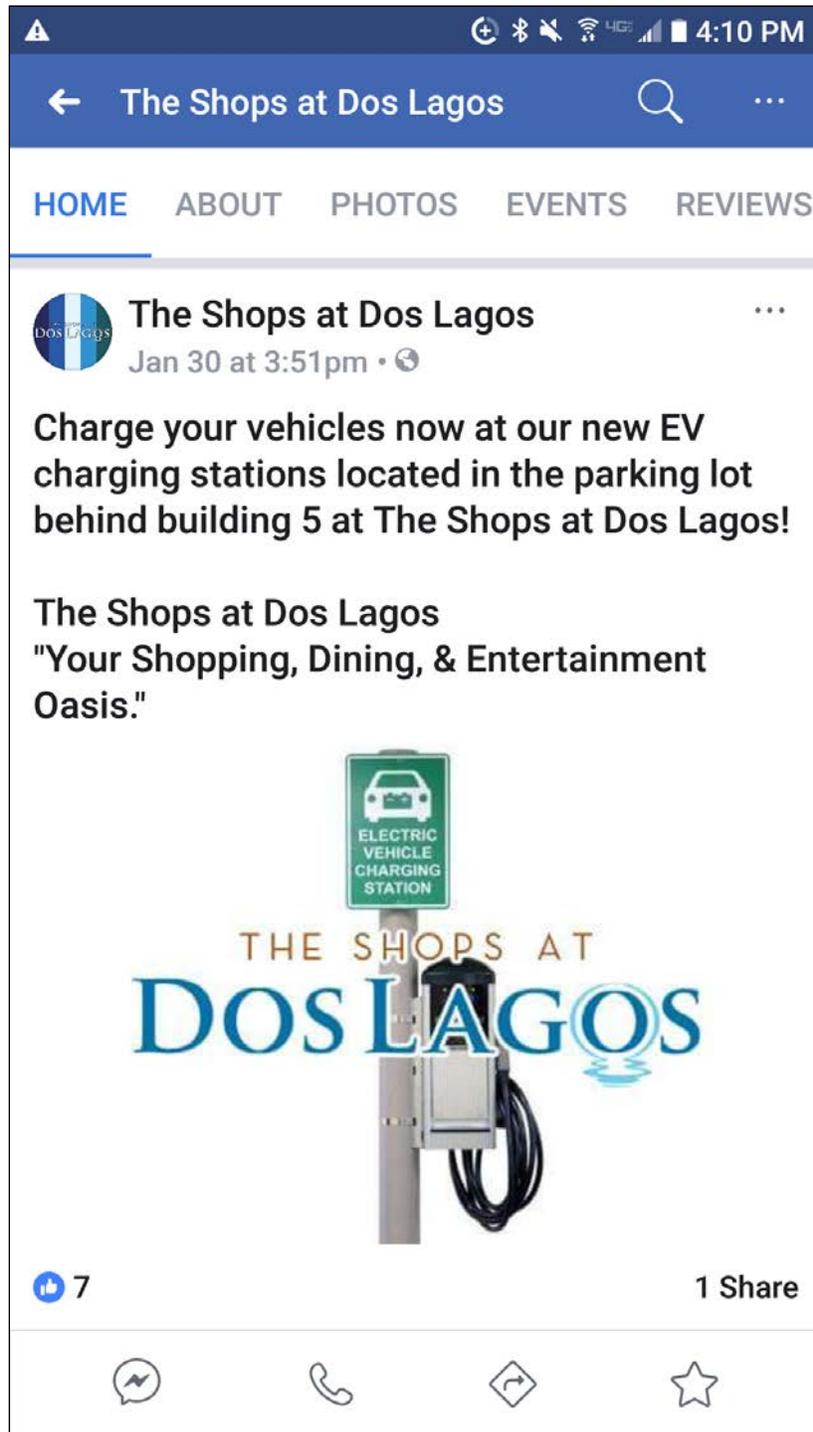
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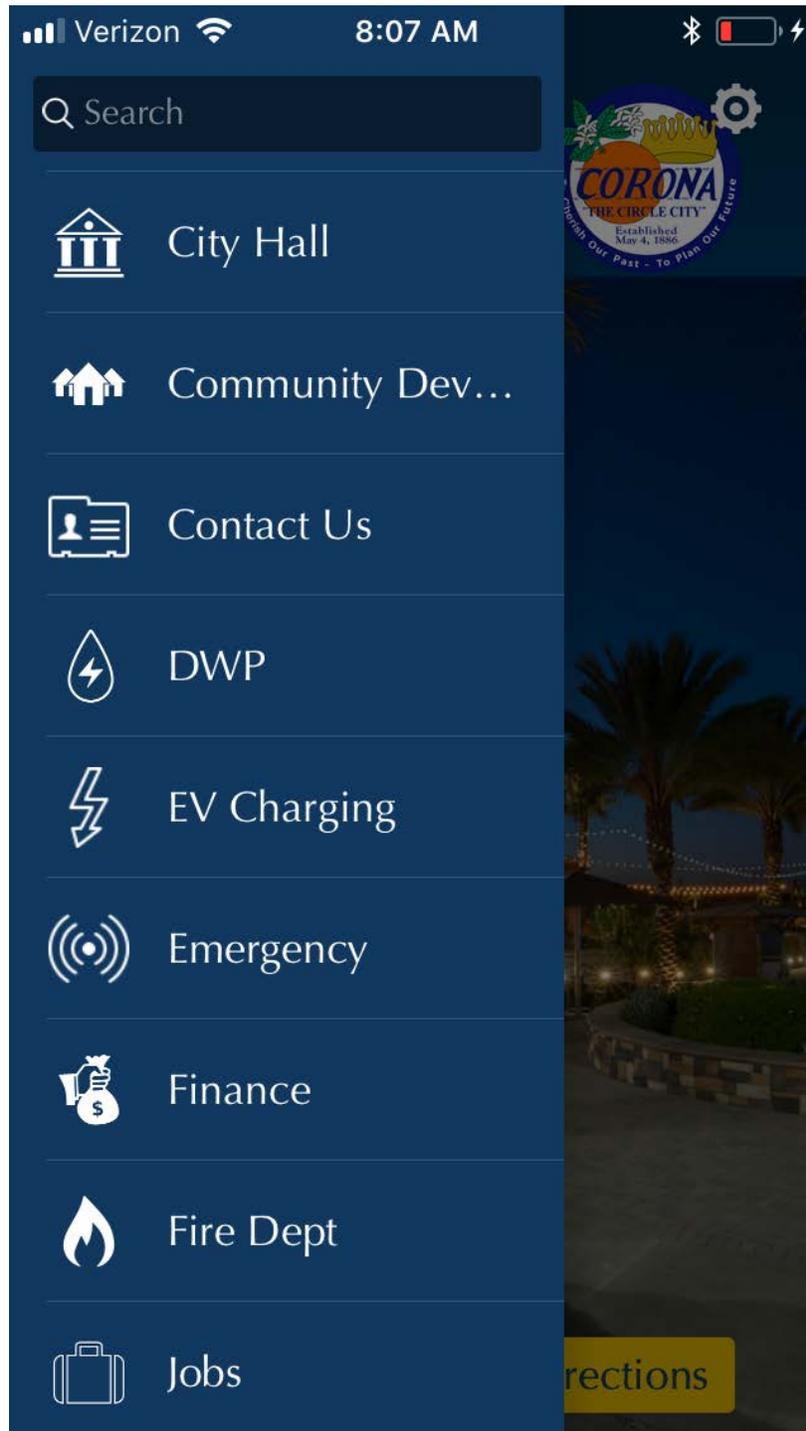
Source: City of Corona, Department of Water and Power

Figure B-3: Screen Shot from The Shops at Dos Lagos Facebook Page



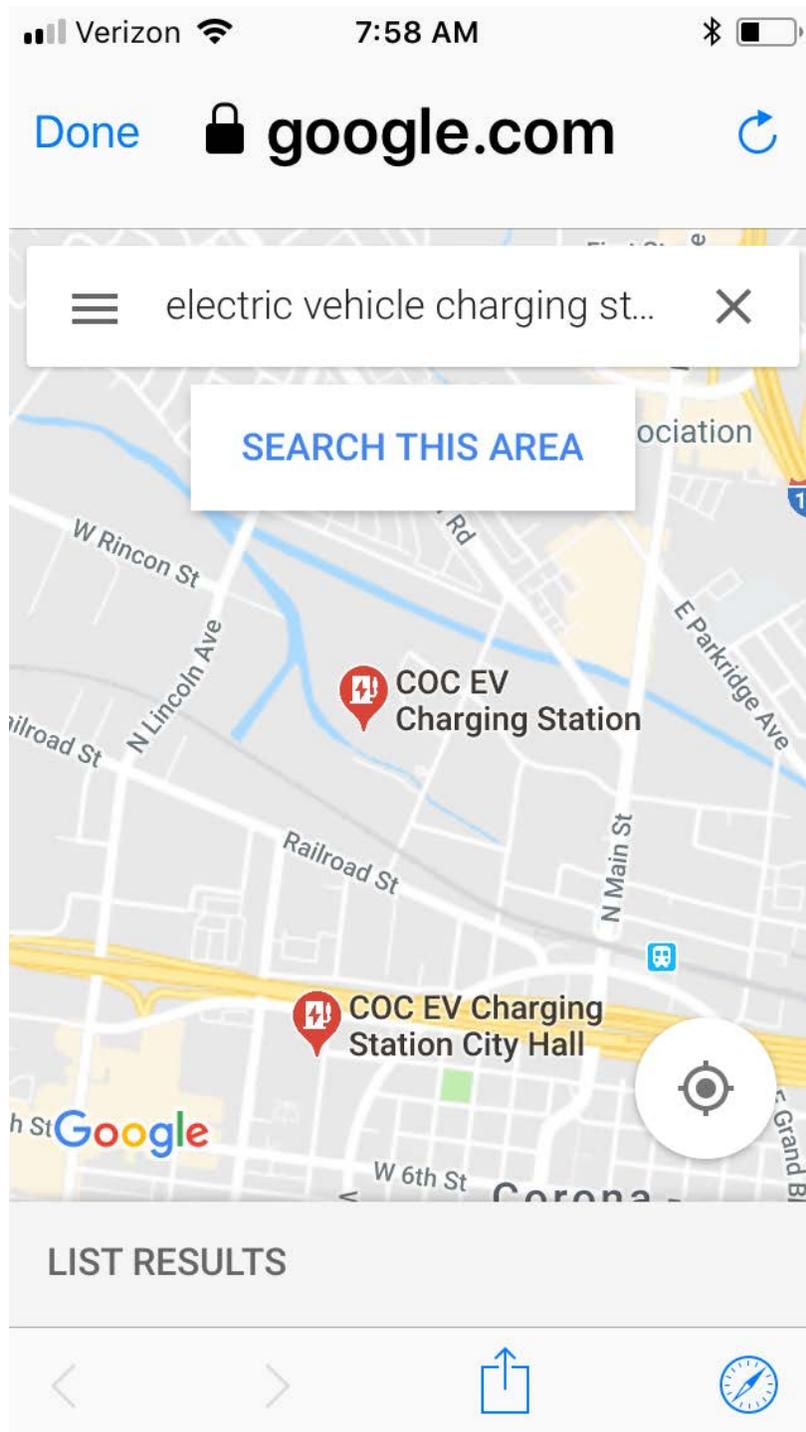
Source: City of Corona, Department of Water and Power (via Facebook.com)

Figure B-4: Screen Shot from City of Corona Mobile App



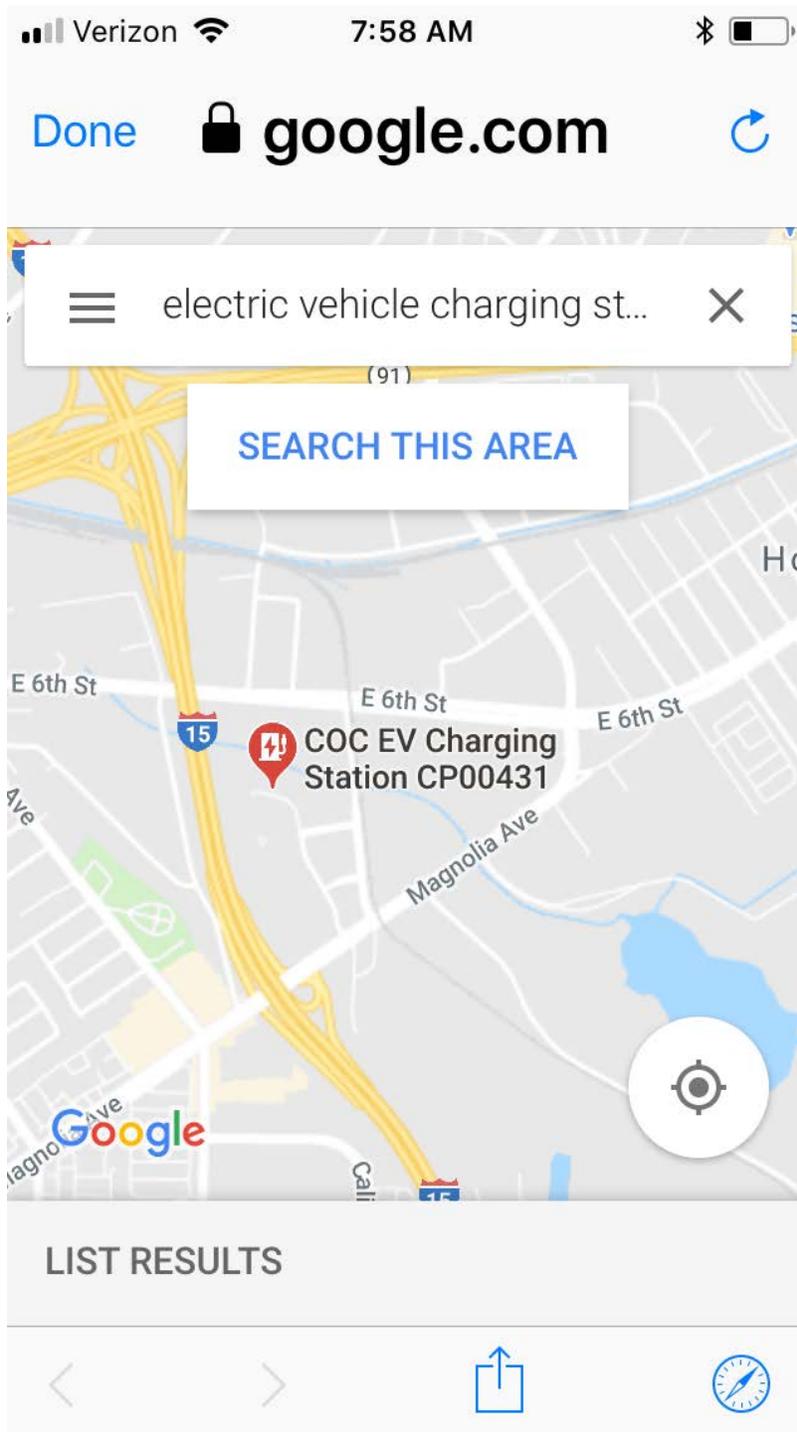
Source: City of Corona, Department of Water and Power

Figure B-5: Screen Shot from City of Corona Mobile App



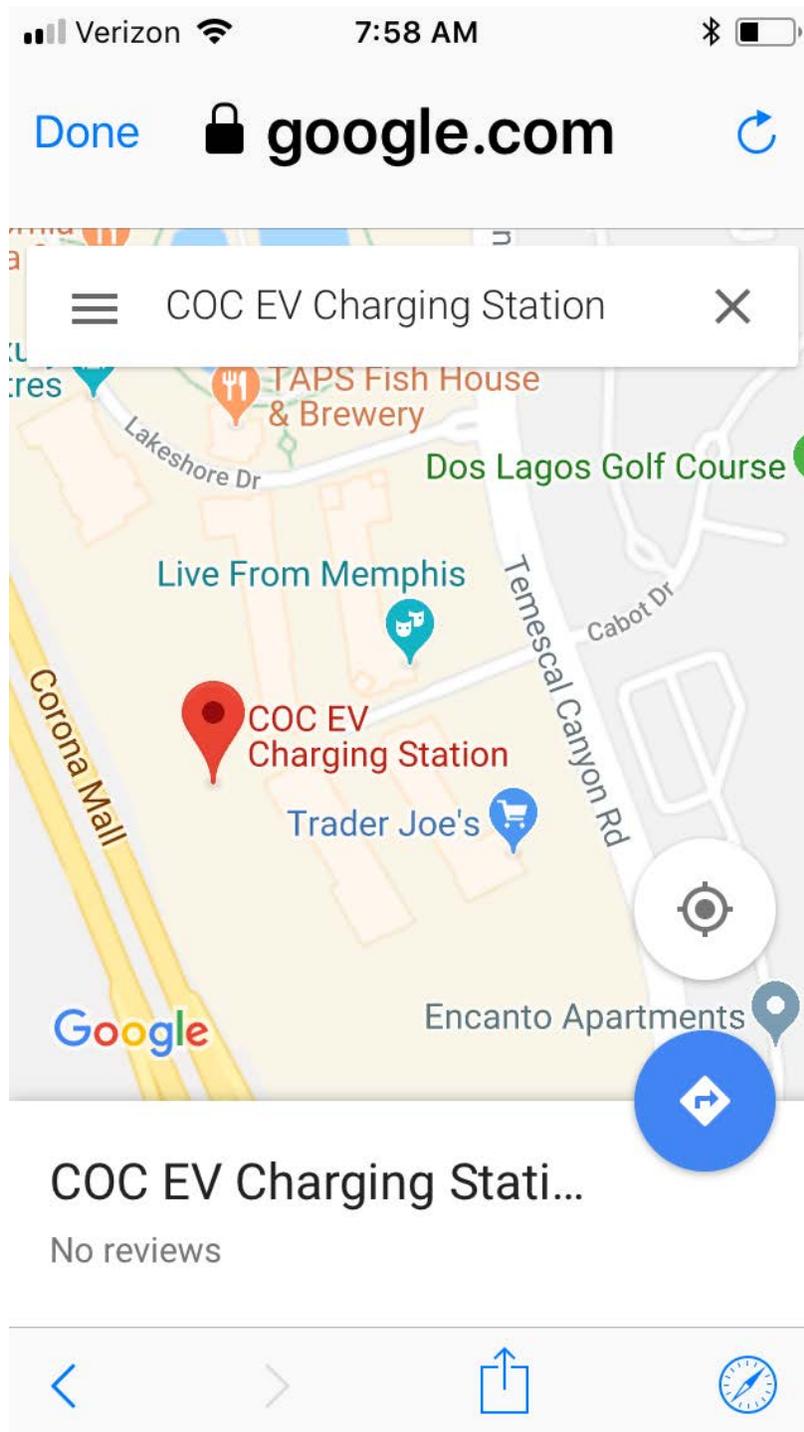
Source: City of Corona, Department of Water and Power, using Googlemaps.com

Figure B-6: Screen Shot from City of Corona Mobile App



Source: City of Corona, Department of Water and Power, using Googlemaps.com

Figure B-7: Screen Shot from City of Corona Mobile App



Source: City of Corona, Department of Water and Power, using Googlemaps.com